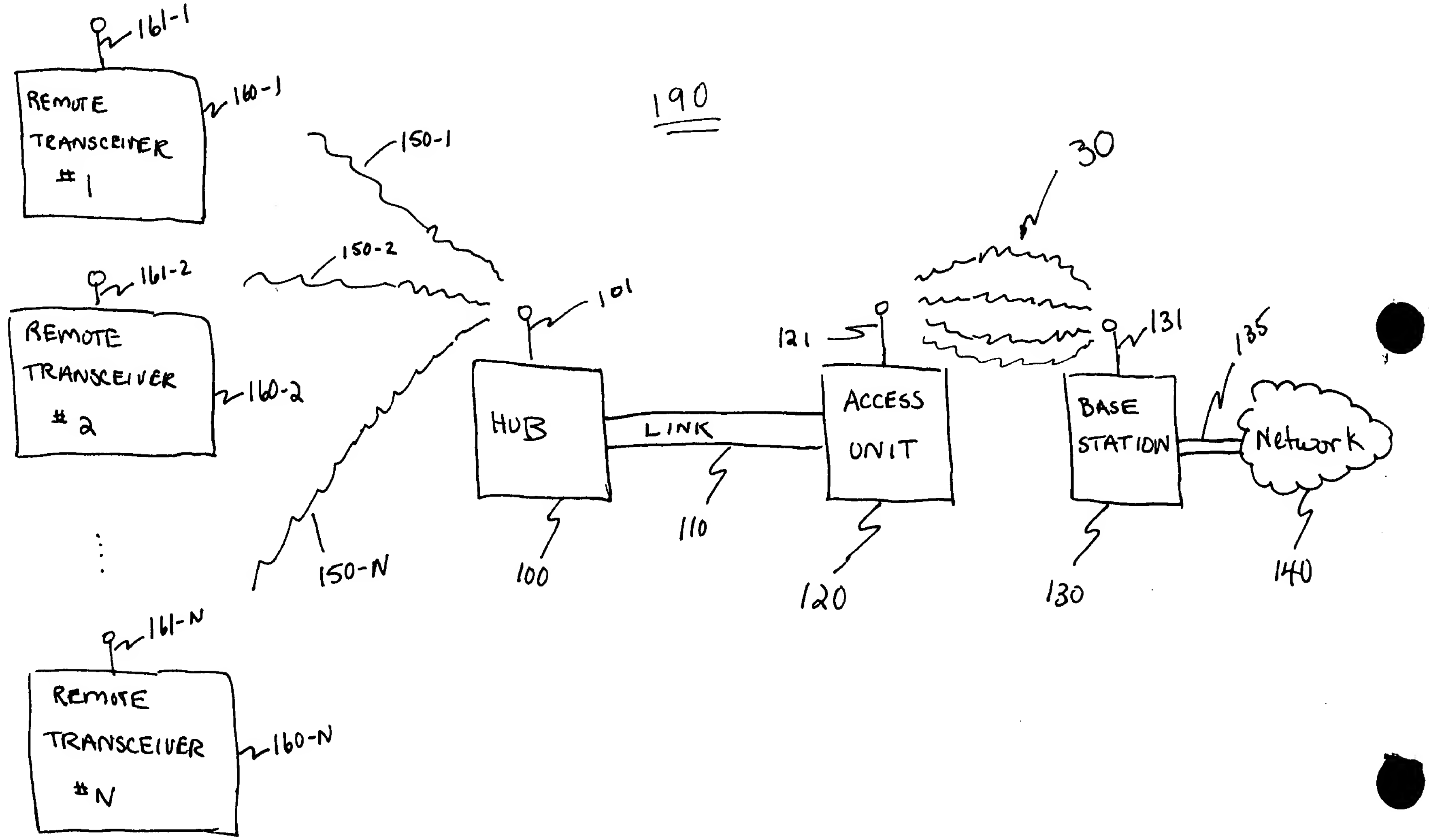


Fig. 1

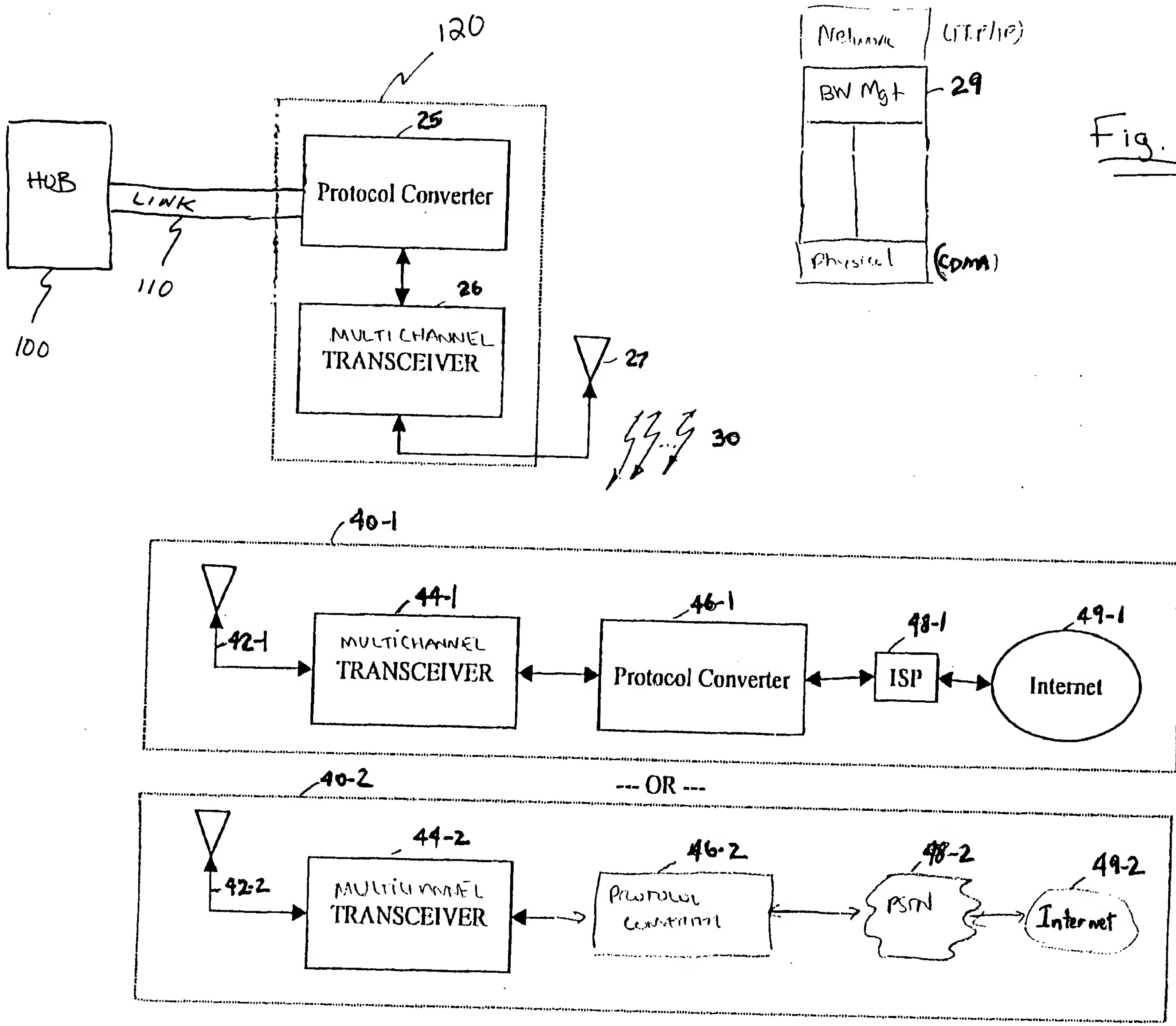

120
HUB
LINK
110
100
25
Protocol Converter
26
MULTI CHANNEL
TRANSCEIVER
27
30
Network (TCP/IP)
BW Mgt
29
Physical (CDMA)
40-1
42-1
44-1
MULTICHANNEL
TRANSCEIVER
46-1
Protocol Converter
48-1
ISP
49-1
Internet
--- OR ---
40-2
42-2
44-2
MULTICHANNEL
TRANSCEIVER
46-2
PROTOCOL CONVERTER
48-2
PSTN
49-2
Internet

Fig. 2

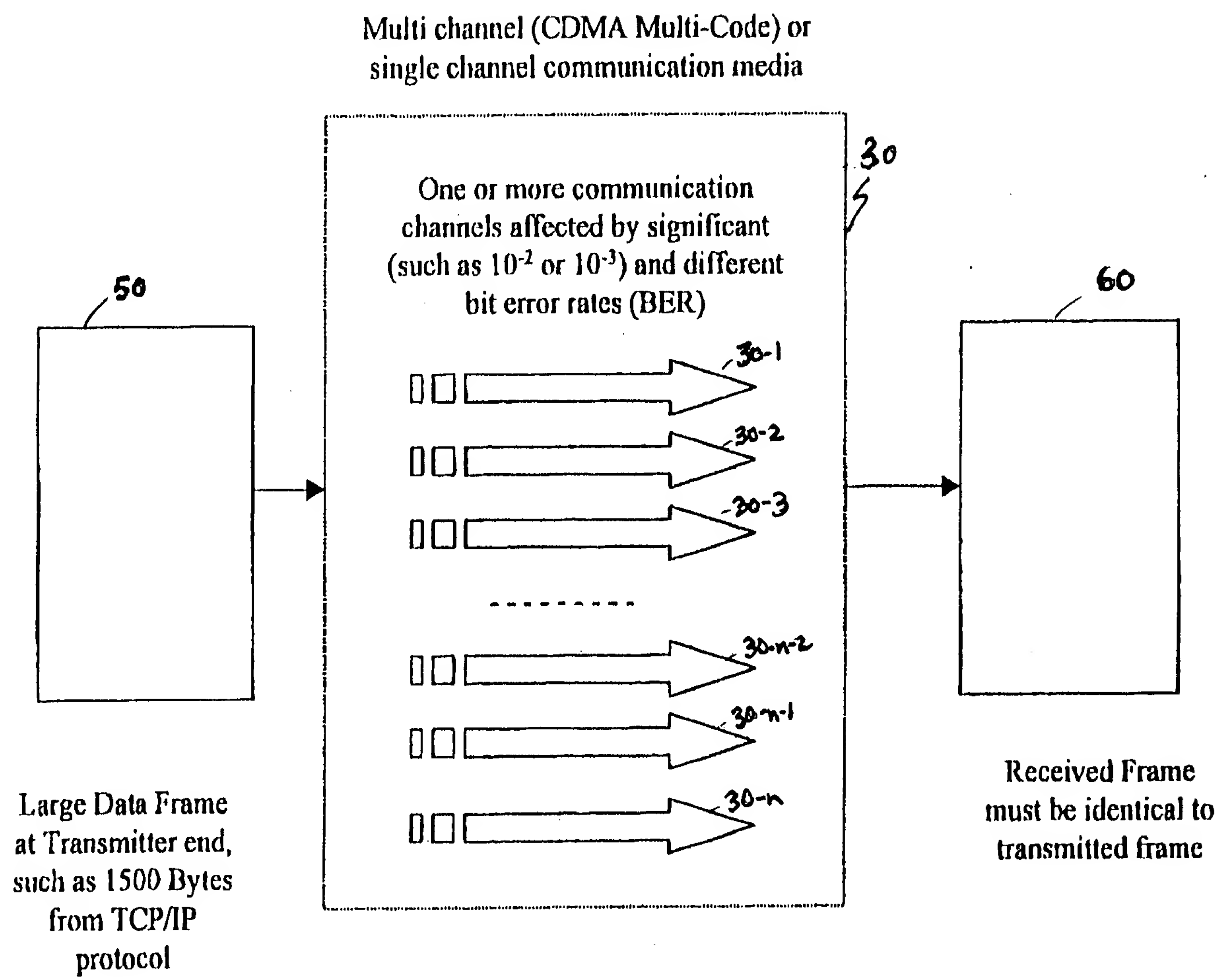

Multi channel (CDMA Multi-Code) or single channel communication media
30
One or more communication channels affected by significant (such as 10-2 or 10-3) and different bit error rates (BER)
30-1
30-2
30-3
30-n-2
30-n-1
30-n
50
Large Data Frame at Transmitter end, such as 1500 Bytes from TCP/IP protocol
60
Received Frame must be identical to transmitted frame

Fig. 3

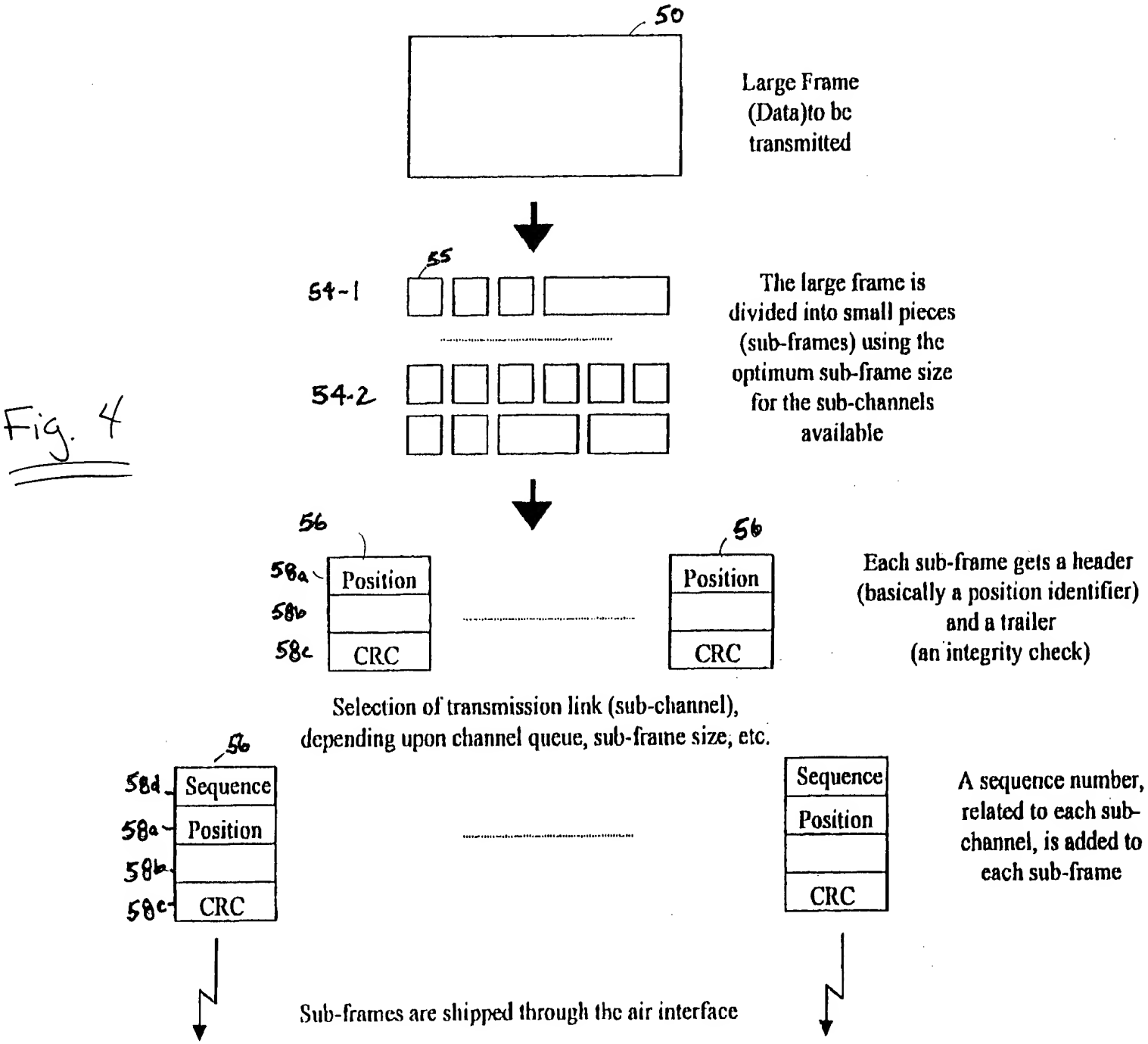

50
Large Frame (Data)to be transmitted
55
54-1
54-2
The large frame is divided into small pieces (sub-frames) using the optimum sub-frame size for the sub-channels available
56
58a
58b
58c
Position
CRC
Each sub-frame gets a header (basically a position identifier) and a trailer (an integrity check)
Selection of transmission link (sub-channel), depending upon channel queue, sub-frame size, etc.
58d
Sequence
A sequence number, related to each sub-channel, is added to each sub-frame
Sub-frames are shipped through the air interface

Fig. 4

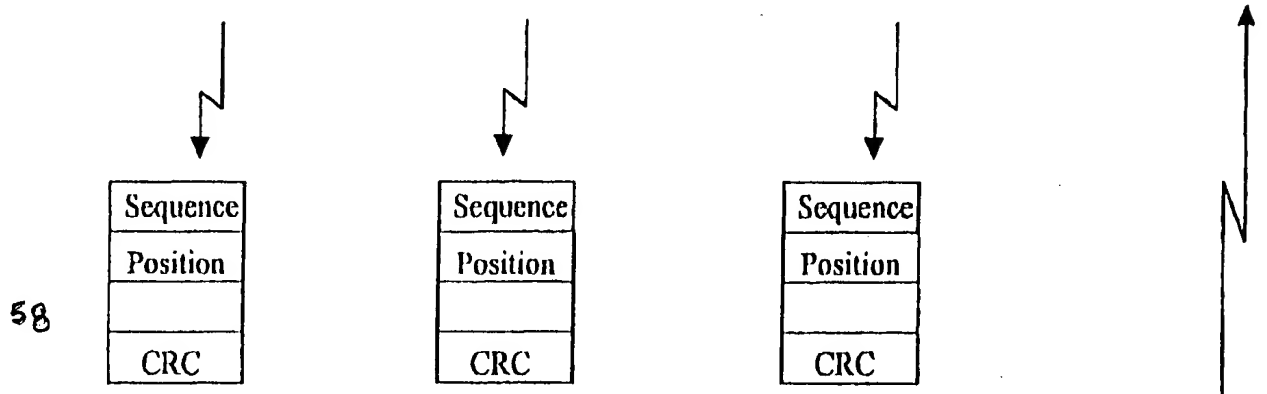
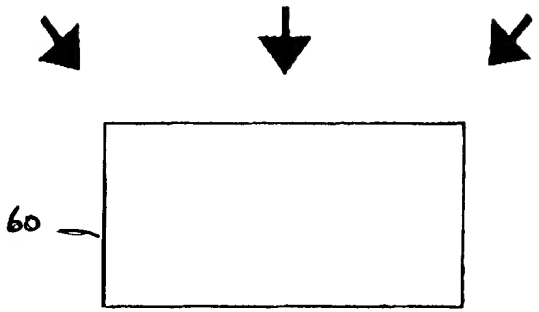


Fig. 5

Use sequence numbers to determine missing sub-frames, and immediately request re-transmission of missing sub-frames



Use position number (offset) to re-construct the large original frame. Only frames with good CRC are used for this purpose

Check if any piece of the large frame is still missing when the end-of-frame command is received. If any is still missing, request retransmission of the sub-frame at position, specifying length.

Both Sender and Receiver know the ratio of sub-frames received with errors and received without errors. They also know the average sub-frame length for each sub-channel. Then they can update the optimum sub-frame size for each sub-channel.